RM96xx
Radio Modem Series

User Manual

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RM96xx
Radio Modem Series

User Manual

Features

- UHF FM Synthesised Radio Transceiver
- Transparent serial data transmission
- RS-232 & RS-485 Serial Data Interfaces
- 6 modes of operation including Asynchronous, Modem and Repeater
- User selectable RF channel, Address and Tx power level
- LED indicators for radio functions, signal strength and serial line status
- Forward Error Correction (FEC)
- Automatic Repeat Request (ARQ)

Brief Description

The RM96xx Series of Radio Modems are a range of UHF multi-channel transceivers, incorporating a GMSK baseband modem and RS232/RS485 serial data interfaces.

As with all RDT Radio Modem products, the RM96xx provides fully transparent operation regardless of the serial data protocol. Over-air speeds up to 16Kbps are achieveable and serial data can be input at various baud rates up to 19,200bps.

Access to all user configurable parameters is possible using the on-board switches and operational status is easily monitored using the standard LED indicators.
Models currently available include the RM96xx Modem Card for OEM customers, the RM96xxB Aluminium housed model and the RM96xxE & EX, IP67 housed units with integral power supplies.

A brief summary of features includes addressing capability, user selectable RF power level and frequency of operation, built-in repeater facility, Forward Error Correction (FEC), Automatic Repeat Request (ARQ), MODBUS compatibility (ASCII & RTU) and Hayes Compatible mode.

The RM96xx utilises RDT's unique multi-channel UHF transceiver which is available as a separate module to OEM customers wishing to take advantage of the superior design, built quality and performance for which our products have a world-wide reputation.

Applications include Alarm Systems, Data Acquisition, Remote Metering, Remote Control Systems, Warehousing and Despatch, SCADA, Security Systems, Video Surveillance Systems, Telemetry, Traffic Information and Control Systems etc.

The RM96xx products carry the CE mark and meet various UK, European and world-wide radio approval specifications including ETS 300 113, ETS 300 220 AND MPT1329. Details are available upon request.

Additional Information

Power Supply

The RM96xx board requires a 12V d.c. power supply which should be well filtered and regulated. On-board voltage regulator circuits will maintain a constant supply of voltage to the radio and logic circuits, however, excessive noise, fluctuations and interference on the d.c. supply may cause loss of data.

Antenna Selection

The antenna should be designed for use at the operating frequency in the 406-470MHz UHF frequency band. The radio range achieved will be dictated by the land topography between the nodes. Ranges quoted below are for guidance only, distances vary according to terrain and obstructions. In many situations increasing atenna height can greatly improve signal strength, and the RSSI test mode can be used for signal strength indicated. Yellow LEDs indicate minimum acceptable signal, green LEDs indicate excellent signal strengh.

Coaxial feeder cable is available in many forms, 50 ohm impedance cable with low loss should always be used, note that 3dB of feeder loss will reduce radiated power by half. In some applications where maximum range is required, directional antennae with gain can compensate for feeder loss provided that the maximum radiated power limit is not exceeded.

When low loss RG213/U or UR67 coaxial cables are employed N-type RF connectors should be fitted in conjunction with one of the Antenna Bulkhead Cable Kits to convert from the SMA of BNC socket on the radio module to N-type RF connectors on the coaxial cable.

Antenna Type	Range	Coverage	Gain	Mounting	Applications
1/2-Wave Whip	1 km	Omnidirectional	-3dB	Enclosure Mounted	Short range general use
End-fed Dipole	10 km	Omnidirectional	0dB	Pole Mounted	Medium range general use
8 Element Yagi	20 km	Directional (40°)	10dB	Pole Mounted	Long range, directional

Antenna Types

Primary Modes of Operation

Asynchronous Mode

In Asynchronous Mode data arrives through either the RS-232 or RS-485 serial port and is placed in the data buffer. As soon as data is detected in the buffer, the transceiver is switched to transmit mode. Once switched to transmit there will be a short delay (10mS), while the synthesiser locks and the transmitter reaches operating power. The data buffer is then inspected to determine the number of bytes available for transmission in this data packet. A small amount of header information (used internally by the receiving RM96xx) and the data bytes are then transmitted along with a 16 bit CRC. After this packet has completed transmission the data buffer is inspected to see if more data has arrived. If more data is available then the transmission process is repeated. When no more data is available the transceiver is switched to receive mode.

When an RM96xx header block containing the appropriate modem address, size of data packet and valid CRC is received then the number of bytes specified in the header block will be read into the data buffer and then output to the RS-232 or RS-485 serial port.

Point to point, multidrop and repeater configurations are feasible in this mode.

Synchronous Mode

In Synchronous Mode timing constraints are imposed on the serial data. This mode is designed to be used in systems such as RTU MODBUS where the end of a message is determined by a gap in the serial data stream of 3.5 characters or more.
Data arrives through either the RS-232 or RS-485 serial port and is placed in the data buffer until a gap of $3^1/_2$ characters is detected in the serial byte stream. At this point, no more serial data can be accepted until the stored data has been transmitted. The transceiver is then switched to transmit and the contents of the data buffer with a header block are sent as a single data packet. The transceiver is then switched to receive mode.

Following reception of a valid header block for synchronous mode, the data packet received is placed into the data buffer. When all the data is in the buffer it is output synchronously to the serial port to ensure no gaps appear in the serial data stream.

Point to point and multidrop configurations are feasible in Synchronous Mode.

Modem Mode

In Modem Mode the transceiver is controlled with the CTS/RTS control line. To transmit, the CTS input must be taken high. When the synthesiser has locked and the transmitter reached operating power the modem will set RTS output high. This signals the user that the RM96xx is now available to accept serial data. Once RTS is raised, the RM96xx will operate in accordance with Asynchronous mode with the exception that the transceiver will stay in transmit until the user lowers CTS.

Note: The diagrams of pages 16 & 17 provide timing information on each of the above modes.

Repeater Modes

From time to time it is necessary to include a repeater in a system for the following reasons:-

- To extend range
- To circumvent obstacles
- Achieving a radio link where circumstances dicate the use of less efficient antennas

A system using a repeater is inherently more complex than one without and it is recommended that first time users may wish to discuss the details of system operation with their modem supplier.

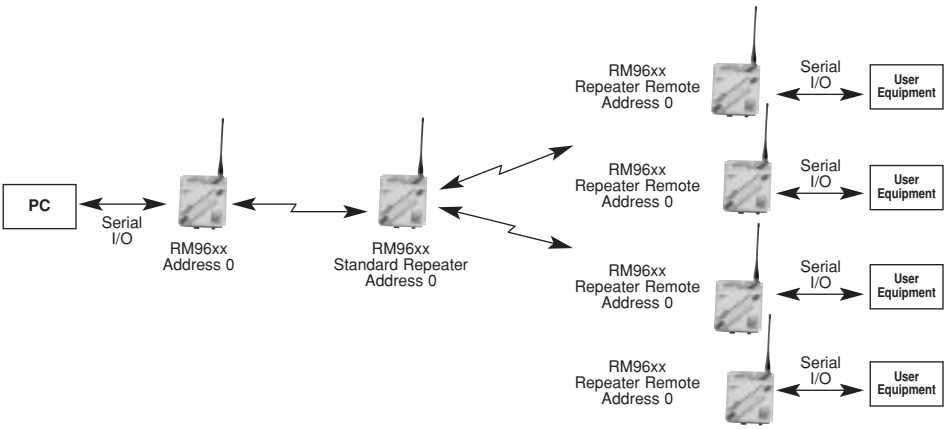
Repeater Modes

The RM96xx series modems have three repeater modes, Standard, Repeat All and Automatic Repeat. These are selected by the normal programming method with the rotary switch in position 3 and using DIL switches 4, 5, 6 and 7.

Standard Repeater

In the Standard Repeater mode all RM96xx units within the system must be set to the same address. The base unit is configured as a standard unit, the repeater is set to 'Standard Repeater' and the remote units must be set to 'Repeater Remote' (see page 14 for switch settings).
The base unit transmits data with a standard header block. To avoid unneccesary interference and the possibility of the remote units interpreting the base station transmissions, the remote units will not accept messages with the standard header block.
When the repeater receives data from the base unit, the header block is changed prior to re-transmission so that the remote units will recognise the transmission.
In the same manner, a remote unit can only transmit data back to the base station via the repeater which changes the header block to the standard acceptable by the base unit.

Standard Repeater



Notes
An RM96xx in Standard Repeater Mode will receive data from normal RM96xx units or from Repeater Remote Units providing they are set to the same address.

A normal RM96xx unit will not receive messages directly from a Repeater Remote.

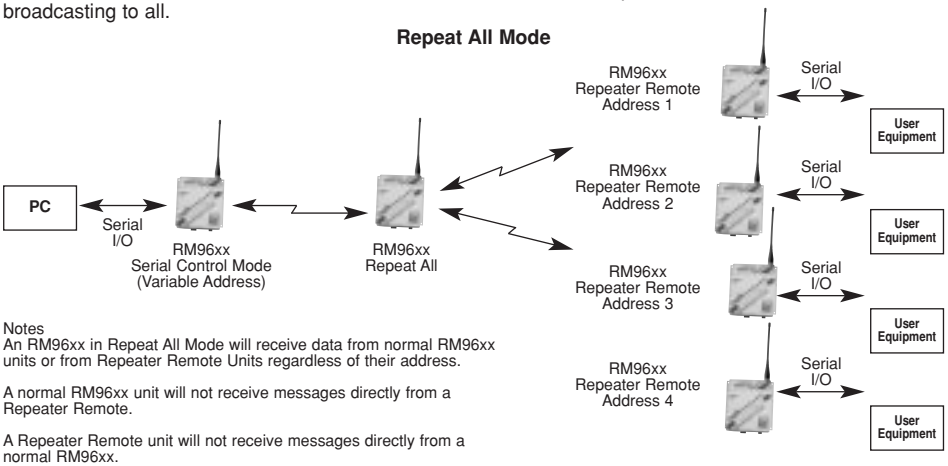
A Repeater Remote unit will not receive messages directly from a normal RM96xx.

... repeater modes continued

Repeat All

Repeat All mode is similar to the Standard Repeater mode with the exception that all valid RM96xx messages are repeated regardless of their address. This permits the use of a base station operating under Serial Control and enables the master to communicate with a specific remote modem rather than broadcasting to all.

Repeat All Mode



Notes
An RM96xx in Repeat All Mode will receive data from normal RM96xx units or from Repeater Remote Units regardless of their address.

A normal RM96xx unit will not receive messages directly from a Repeater Remote.

A Repeater Remote unit will not receive messages directly from a normal RM96xx.

Date sent from the Serial Control RM96xx will only be output at the Repeater Remote which is set to the same address.

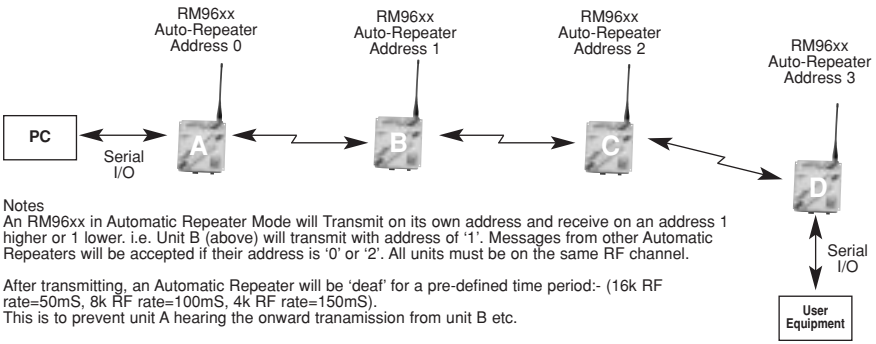
Automatic Repeat

Automatic Repeat mode allows a message to be automatically transmitted along a 'chain' of up to 255 repeaters. Each repeater has its address set 1 above its predecessor in the chain. Each unit 'listens' for messages from units with addresses 1 below or 1 above their own. (For example unit 6 will listen for messages from 5 and 7). When it receives a message from the higher of lower address it will re-transmit it on its own address. Having transmitted it will disable its receiver for approximately 50mS to prevent reception of the onward transmission.

A received message is repeated and output to the selected serial port at the same time. A message input at the serial port of any modem in the chain will travel along the chain in both directions.

Customers wishing to use this mode of operation should contact their distributor or RDT technical support for system planning assistance.

Automatic Repeater



Notes
An RM96xx in Automatic Repeater Mode will Transmit on its own address and receive on an address 1 higher or 1 lower. i.e. Unit B (above) will transmit with address of '1'. Messages from other Automatic Repeaters will be accepted if their address is '0' or '2'. All units must be on the same RF channel.

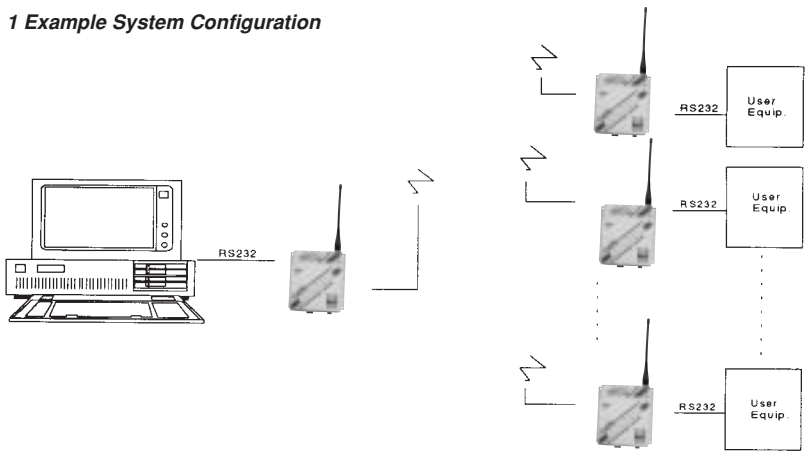
After transmitting, an Automatic Repeater will be 'deaf' for a pre-defined time period:- (16k RF rate=50mS, 8k RF rate=100mS, 4k RF rate=150mS).
This is to prevent unit A hearing the onward tranamission from unit B etc.

Serial Control Mode

Introduction

Selecting Serial Control mode permits various Radio Modem parameters to be interrogated and modified via the serial port instead of using the on-board DIL switches.
In some applications the user equipment takes care of addressing in which case an RM96xx operating in one of the standard modes can be utilised to provide a straight forward transparent serial data link.
In applications where the user equipment is not addressable, the address of the base station RM96xx will need to be changed to enable communications with remote units that are set to unique addresses. In applications such as this, Serial Control provides the solution.

FIG. 1 Example System Configuration



Operational Overview

A typical configuration is detailed in Fig.1 above. Basically, in a polled system with one master unit and several remote units the system operates as follows;

Each remote unit is a standard RM96xx with a unique address and/or RF channel set via the on-board DIL switches.
The master unit is set to operate in Serial Control Mode. It receives ASCII text strings from the host in a simple format which specify or interrogate it's address or RF channel number.
The master unit responds to the host with a reply string confirming the action or containing the value of the address/RF channel number currently set.

Serial data is transferred until a command is received to change to another address or RF channel.

In this configuration the master station can only listen to one remote station at a time. This is not a problem when using a polling system because the radio modems communicate with each other in pairs.

Global Addressing

Global addressing may be selected from software versions 2.4 (RM9600) and 2.5 (RM9634) onwards. This function allows a broadcast message to all stations in systems operating under serial control where messages are normally directed to a specific selected station. It is activated by sending the serial control command to select address 255 to the master station or any station that must broadcast to all others on the system.

... serial control mode continued

Configuring the RM96xx

Setting Serial Control Mode

Select Serial Control mode by turning the rotary switch (SW2) to position 3 and switching DIL switch SW1 position '3' to the 'ON' position.
Ensure that all the remaining DIL switches are set to the required positions before pressing the STORE button (SW3) to activate the settings.

Return the rotary switch to the '0' position when all options are configured.

Operation

Upon power-up the RM96xx will use the current DIL switch settings for Address and RF Channel. If the DIL switches are changed during operation then this change will overide the last serial command.

The serial commands will only work in RUN mode, with either of the following operational modes selected:-

Asynchronous Mode with or without ARQ
Synchronous Mode with or without ARQ

Set or Interrogate commands will only be accepted if the RM96xx has no data to transmit and no data to output on the serial port, otherwise they will be ignored and no response returned on the serial port. If there is no response to a command, programming has not been successful.

Note that an RM96xx can only be successfully reprogrammed when it has completed it's present data transfer.

The maximum time taken to program an Address is 2mS.
The maximum time taken to program a new RF channel is 15mS.

The responses to Address and Channel commands will occur within the times indicated above (assuming the commands were successful).

If the requested RF channel exceeds the maximum allowed (as defined by the radio), then the RM96xx defaults to the highest permissable RF channel.

Any input string that does not meet the command string format or specifies an address that is out of range will be treated as normal ASCII text and transmitted.

Guard Time

In some instances, the user's data may be the same as a valid command string which will cause problems with the system operation.
With a <GUARD TIME> selected, any command string must be preceded by a period of inactivity on the serial interface which is the same as or longer than the <GUARD TIME> selected. Each command is preceded by a <GUARD TIME>, the length of which is user selectable.

Users not wishing to use the <GUARD TIME> facility must select 'No Guard Time' from the options available.

ROTARY SWITCH = 7

SWITCH SW1	1	2	3	4	5	6	7	8
Description	SPARE	SPARE	Serial Control Guard Time		ARQ Retries	Global Address	SPARE	SPARE
Options			**OFF** **OFF = No Guard Time** OFF ON = 200 mS ON OFF = 500 mS ON ON = 1 Second		**OFF = 20** ON = Infinite	**OFF** ON		

Bold items denote factory defaults.

... serial control mode continued

Command Format
Serial Control mode allows the user to set or enquire about the value of an Address or RF Channel number. The command format for each of the functions is as follows:

Set Address

Send Text String	RM9600 Reply String	Function
<GUARD TIME>"A000	"A:000<CR>	Sets Address 0
<GUARD TIME>"A001	"A:001<CR>	Sets Address 1
<GUARD TIME>"A002	"A:002<CR>	Sets Address 2
<GUARD TIME>"A003	"A:003<CR>	Sets Address 3
" "	"	"
<GUARD TIME>"A255	"A:255<CR>	Sets Address 255

Note <CR> signifies a carriage return code

Interrogate Address

Send Text String	RM9600 Reply String	Function
<GUARD TIME>"A???	"A:xxx<CR>	Returns current address in xxx

Set RF Channel No.

Send Text String	RM9600 Reply String	Function
<GUARD TIME>"C000	"C:000<CR>	Sets Channel 0
<GUARD TIME>"C001	"C:001<CR>	Sets Channel 1
<GUARD TIME>"C002	"C:002<CR>	Sets Channel 2
<GUARD TIME>"C003	"C:003<CR>	Sets Channel 3
"	"	"

Up to maximum number of channels as specified in the EEROM

Interrogate Channel No.

Send Text String	RM9600 Reply String	Function
<GUARD TIME>"C???	"C:xxx<CR>	Returns current channel no - xxx

Notes

1. The command format is case sensitive - all commands must be in UPPER CASE.
2. Any character string not compliant with the above formats will not be recognised and will be transmitted as normal data.
3. Detection of the " character will cause the modem to re-sync it's 4 byte capture to the first byte of the string. This enables the modem to respond correctly following a character loss.
4. Each command is preceeded by a <GUARD TIME>, the length of which is selectable with the rotary and DIL switches.

User Controls

Factory Settings

The RM96xx is shipped from the factory pre-programmed to operate with the following settings:-

Serial Port	
Mode	Async, FEC On
Listen Before Tx	ON
Serial Port	RS232
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
RF Parameters	
RF Channel	1
Power Level	500mW
Address	0
RF Data Rate	16K

User Configuration

Settings are altered by following 3 simple steps:-

1. Adjust Rotary switch (SW2) for desired function (see table 1)
2. Select required parameters using DIL switch (SW1)
3. Press 'STORE' button (SW3)

The above steps may be repeated for each Rotary Switch function indicated in the table on page 14. (refer to notes for exceptions to this rule)

To ease configuration, LED indicators D10-D17 display the current stored DIL switch settings for each rotary switch function, excluding functions '0' and '1'.

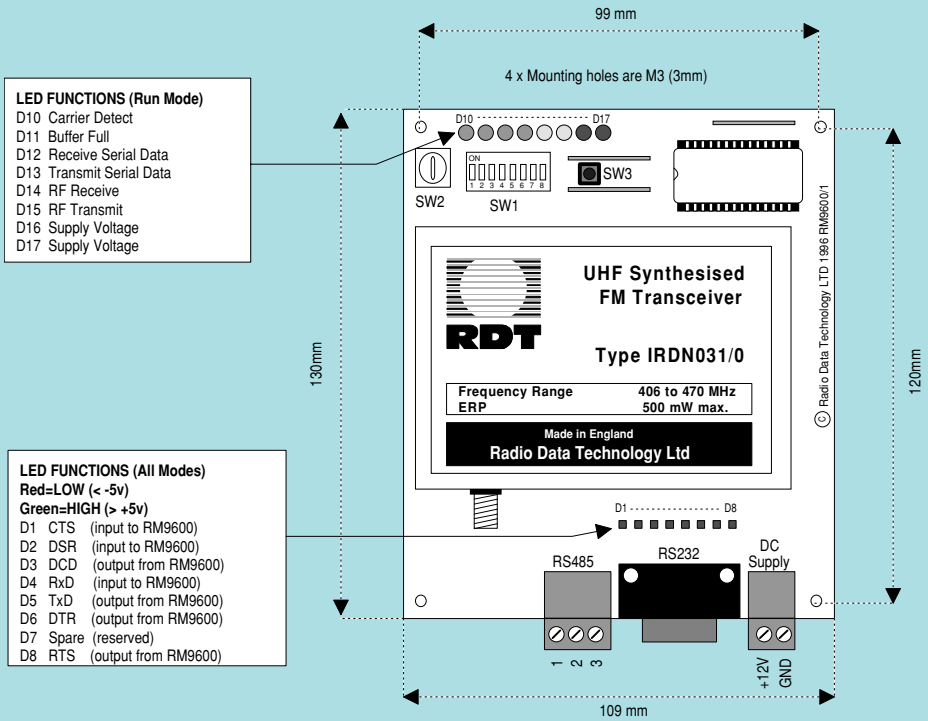


FIG. 2 RM96xx Radio Modem Board Layout

RM96xx User Configurable Settings

ROTARY SWITCH = 0

RUN MODE

1	2	SWITCH SW1
RF POWER		
OFF	OFF	50mW
OFF	ON	100mW
ON	OFF	250mW
ON	**ON**	500mW

3	4	5	6	7	8	
RF CHANNEL						
OFF	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	LOWEST FREQ
OFF	OFF	OFF	OFF	OFF	ON	
etc.	etc.	etc.	etc.	etc.	etc.	
ON	ON	ON	ON	ON	ON	HIGHEST FREQ

ROTARY SWITCH = 1

TEST

1	2	SWITCH SW1
TEST MODE		
OFF	-	Receive
ON	-	Transmit

3	4	5	6	7	8	
RF CHANNEL						
OFF	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	LOWEST FREQ
OFF	OFF	OFF	OFF	OFF	ON	
etc.	etc.	etc.	etc.	etc.	etc.	
ON	ON	ON	ON	ON	ON	HIGHEST FREQ

ROTARY SWITCH = 2

ADDRESS

1	2	3	4	5	6	7	8	
UNIT ADDRESS								
OFF	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	ADDRESS '0'
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	
etc.	etc.	etc.	etc.	etc.	etc.	etc.	etc.	
ON	ON	ON	ON	ON	ON	ON	ON	ADDRESS '255'

Note: Address 255 is reserved for broadcasting a message in Serial Control mode. Please refer to 'Global Addressing' section of Serial Control on page 10.

ROTARY SWITCH = 3

OPERATING MODE

1	2	
PRIMARY MODE OF OPERATION		
OFF	**OFF**	ASYNC
OFF	ON	SYNC
ON	OFF	MODEM
ON	ON	N/U

3	4	5	6	7	8
SERIAL CONTROL	REPEATER ON/OFF	REPEAT ALL ON/OFF	AUTO REPEAT ON/OFF	REPEATER REMOTE	RS232/ RS485
	OFF-X-X = REPEATER OFF				**OFF = RS232**
OFF	ON-OFF-OFF = STANDARD REPEATER			**OFF**	
ON	ON-OFF-ON = AUTOMATIC REPEATER			ON	ON = RS485
	ON-ON-OFF = REPEAT ALL				

ROTARY SWITCH = 4

RF PARAMETERS

1	2	
RF BAUD RATE		
OFF	OFF	4K
OFF	ON	8K
ON	**OFF**	16K
ON	ON	N/U

3	4	5	6	7	8
LISTEN BEFORE Tx	FEC ON/OFF	ARQ ON/OFF	RTS/CTS HANDSHAKE	DSR/DTR H'SHAKE	ARQ TIMEOUT
OFF	OFF	**OFF**	**OFF**	**OFF**	**OFF= Std**
ON	**ON**	ON	ON	ON	ON= Extended

ROTARY SWITCH = 5

SERIAL INTERFACE CONFIGURATION

1	2	3	
SERIAL PORT BAUD RATE			
OFF	OFF	OFF	150
OFF	OFF	ON	300
OFF	ON	OFF	600
OFF	ON	ON	1200
ON	OFF	OFF	2400
ON	OFF	ON	4800
ON	**ON**	**OFF**	9600
ON	ON	ON	19200

4	5	
PARITY		
OFF	**OFF**	NONE
ON	OFF	EVEN
ON	ON	ODD

6	7	
CHARACTER LENGTH		
OFF	OFF	7 BITS
OFF	**ON**	8 BITS
ON	ON	9 BITS

8	
STOP BITS	
OFF	1
ON	2

ROTARY SWITCH = 6 UPDATE EEROM (See notes page 15)
ROTARY SWITCH = 7 SERIAL CONTROL (See pages 10-12)
ROTARY SWITCH = 8 HAYES MODE (See pages 7-9)
ROTARY SWITCH = F FACTORY SETTINGS (See notes page 15)

ROTARY SWITCH POSITIONS '9' TO 'E' ARE NOT USED

BOLD ITEMS DENOTE FACTORY DEFAULTS

Timing Diagrams

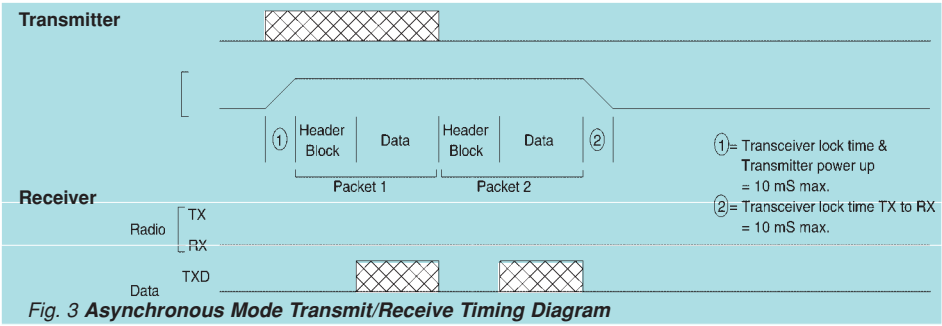


Fig. 3 ***Asynchronous Mode Transmit/Receive Timing Diagram***

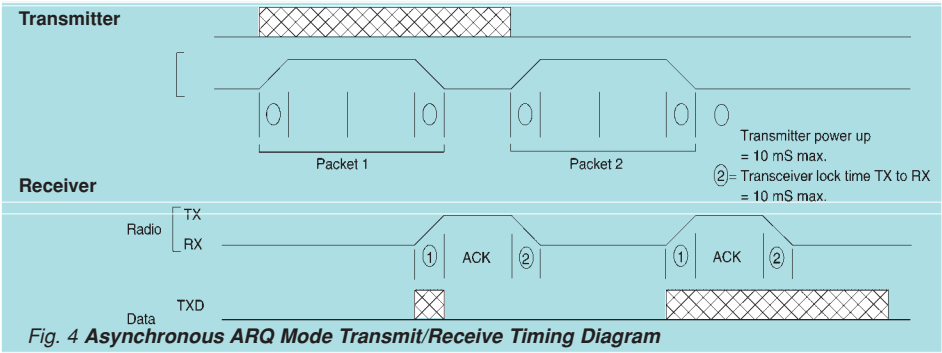


Fig. 4 ***Asynchronous ARQ Mode Transmit/Receive Timing Diagram***

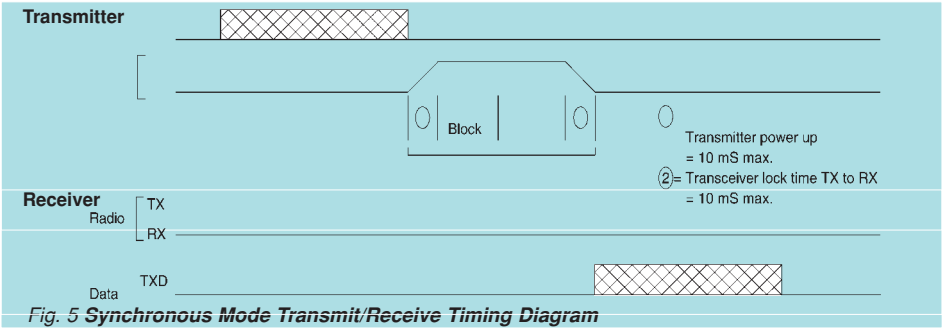


Fig. 5 ***Synchronous Mode Transmit/Receive Timing Diagram***

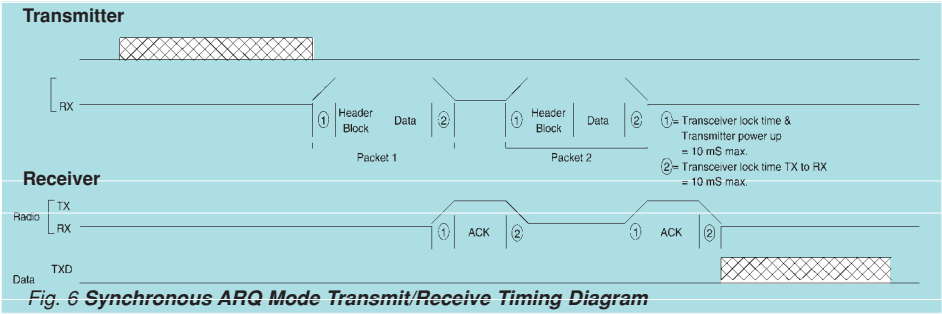


Fig. 6 ***Synchronous ARQ Mode Transmit/Receive Timing Diagram***

.... timing diagrams continued

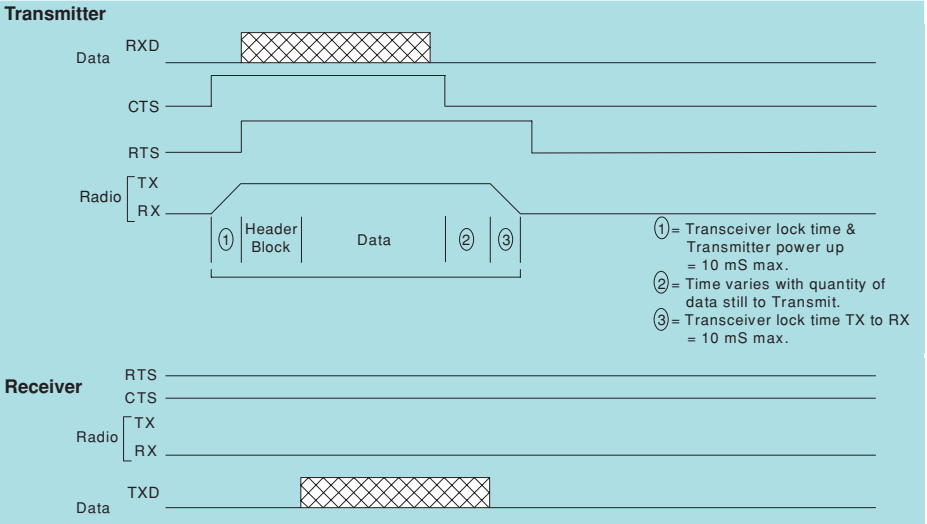


Fig. 7 ***Modem Mode Transmit/Receive Timing Diagram***

Specifications – Specific Models

RM9600

General

Frequency Range	10MHz band in the range 406 - 470 MHz
Channel Spacing	10, 12.5, 20 or 25kHz

Transmitter

RF Power Output	50 - 500mW (in 4 steps)
Adj. Channel Power	-37dBm
Freq. Tolerance	± 3ppm
FM Deviation	± 3.5kHz

Receiver

RF Sensitivity	- 110dBm for 10^{-4} BER
Intermodulation	-70dB
Adj. Channel Rejection	-70dB

RM9634

General

Frequency Range	10MHz band in the range 406 - 470 MHz
Channel Spacing	12.5, 20 or 25kHz

Transmitter

RF Power Output	50 - 500mW (in 4 steps)	
Adj. Channel Power	-37dBm	
Freq. Tolerance	± 1kHz	
FM Deviation	± 2kHz	
Intermod Attenuation	>40dB	
Spurious Emissions	<-36dBm	0-1 GHz
	<-30dBm	1-4 GHz

Receiver

RF Sensitivity	- 110dBm for 10^{-4} BER	
Co-channel Rejection	>-12dB	
Adj. Channel Selectivity	>60dB	
Spurious Response Rejection	>70dB	
Intermod Response Rejection	>70dB	
Blocking	>84dB for any signal >50kHz from the tune frequency	
Spurious Emissions	<-57 dBm	0-1 GHz
	<-47dBm	1-4 GHz

Specifications – All Models

RSSI Threshold Level	-105dBm at 16K -110dBm at 8K/4K	Interface Baud Rate	150-19.2 Kbaud, adjustable
		Parity	Odd, Even or None
Max. Bit Rate	16kbps (25KHz) 8kbps (10/12.5/20KHz)	Data Buffer	4 Kbytes Tx, 2 Kbytes Rx
		Stop Bits	1 or 2
Modulation	GMSK	Data Bits	7, 8 or 9

.... specifications continued

Mechanical & Environmental

Size	
RM96xx	130 x 109 x 32mm
RM96xxB	142 x 150 x 47mm
RM96xxE/EX	280 x 190 x 130mm
Weight	
RM96xx	400 g
RM96xxB	900 g
RM96xxE/EX	3.6 kg
Operating temperature	-25 to +60°C
Operating humidity	20% to 75% RH

Power Supply

RM96xx/B	
Power Supply	10.5 - 15.5V d.c.
Supply Current	Tx 550mA (500mW)
	Rx 260mA
RM96xxE/EX	
Power Supply	220-260V a.c. 50Hz
Supply Current	250mA max a.c.

RS232/RS485 Serial Port Connections

RS232/485

The RM96xx has two serial ports, a 9-Way 'D' Type connector (RS232) and a two part Phoenix connector (RS485). Connections are as follows:-

RS485 2-Part	Description
Pin 1	'B'
Pin 2	'A'
Pin 3	'GND'

RS232 9-Way 'D'	Description
Pin 1	DCD Data Carrier Detect
Pin 2	RxD Receive Data
Pin 3	TxD Transmit Data
Pin 4	DTR Data Terminal Ready
Pin 5	GND Ground
Pin 6	DSR Data Set Ready
Pin 7	RTS Request To Send
Pin 8	CTS Clear To Send
Pin 9	Rx Buffer Indicator

Pin 9 is the Ring Indicator (RI) when used in Hayes Mode, see page 9.

Software Revisions

RM9600 - STANDARD SOFTWARE (RM9600-1)

Date	Ver. No	Comments
11/11/96	V1.0	First Issue
26/11/96	V1.1	Data Integrity upgrade
26/03/97	V1.2	C23/C24 channel upgrade
02/04/97	V1.3	ARQ Sync. Mode upgrade
03/06/97	V1.4	20kHz Option
10/06/97	V1.5	Repeater functionality
15/09/97	V1.6	Rx interrupt upgrade
22/09/97	V1.7	Serial Control Mode ARQ Synch. Mode upgrade
04/11/97	V2.0	FEC OFF option ARQ - 20 retries or infinite Auto RF baud rate selection Serial Control 7 bit data
20/11/97	V2.1	Modem Mode operation
19/06/98	V2.2	485 Sync. Mode Upgrade
10/04/99	V2.3	Hayes Mode
29/07/99	V2.4	Global Addressing RF Data RX Indication Serial Control Parity upgrade
05/10/99	V2.5	Ring Indicator for Hayes Mode DCD Indication added

RM9600 V2.3 onwards requires RM9600-2 control board

RM9634 - STANDARD SOFTWARE (RM9634-1)

Date	Ver. No	Comments
20/11/97	V2.1	First Issue
03/06/98	V2.2	Optimise data handling
19/06/98	V2.3	485 Sync. Mode upgrade
10/03/99	V2.4	Hayes Mode
29/07/99	V2.5	Global Addressing RF Data RX Indication Serial Control Parity upgrade
05/10/99	V2.6	Ring Indicator for Hayes Mode DCD Indication added

RM9634 V2.4 onwards requires RM9600-2 control board